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Empire who are interested in the development of Astronomy we gratefully acknowledge the benefits we have enjoyed during the long continuance of Your Majesty's reign, and pray that for many years Your Majesty may be spared to rule over us."

The Address was presented by the President (Sir R. S. Ball) and one of the Secretaries (Professor H. H. Turner), and the following reply was handed to the President:—

"On behalf of the Queen, my dear Mother, I thank you for your loyal and dutiful Address and for the affectionate congratulations which you tender on the completion of the sixtieth year of Her reign.

"It is a source of profound joy to the Queen to receive the expressions of devotion to Her person and family which are offered by Her subjects throughout the Empire. She is gladdened by the thought that the sixty years of Her reign have been years of progress in knowledge and of increase in prosperity; and She prays that, by the blessing of Almighty God, She may always live in the hearts of Her loving and beloved people."

The President has since received the Jubilee Medal from Her Majesty.

Note on a result concerning Diffraction Phenomena used by Professor Wadsworth in several recently published papers.

By H. F. Newall, M.A.

Professor Wadsworth has recently published in a great number of journals (*Observatory*, *Knowledge*, *Astrophysical Journal*, *Monthly Notices of R.A.S.*, *Astronomische Nachrichten*) remarks concerning the performance of various lenses with respect to photographic delineation of faint nebulæ, &c. Underlying these remarks is a misinterpretation of a result obtained by Stokes in 1853, and it seems desirable to point out the error.

Stokes gave (*Trans. R.S. Edin.* xx. 1853) a general analytical verification of a result obtained for certain special cases by Kelland (*Trans. R.S. Edin.* xv.). These results were reached by Kelland in a comparison of the total quantity of light coming from a distant point and falling on an object glass, with the total quantity of light in the resulting diffraction pattern, which forms the image of the distant point. It was at that time a question whether any of the energy was lost as *light*, or whether light was simply transferred from dark rings in the diffraction pattern and piled up in the bright rings without any loss.

Stokes and Kelland showed that the total quantity of light in the diffraction pattern $\Big($viz. $\int_{-\infty}^{+\infty}\int_{-\infty}^{+\infty} \mathrm{I}\, d\xi\, d\eta$ in the usual

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notation) was equal to the total quantity incident upon the object glass, viz. $\int\int dx\,dy$=area of object glass, where the intensity, *i.e.* the quantity of light per unit area, incident on the object glass is unity.

The incident light was regarded as coming from a *single distant point*, so that the wave front on the object glass was plane, with uniform distribution over it.

The integral was taken over the diffraction pattern nominally between the limits $-\infty$ and $+\infty$ for both ξ and η, but practically the quantity of light contributed by an element of area in the focal plane falls off very rapidly as the distance of the element from the centre of the diffraction pattern increases.

The meaning of the infinite limits is entirely different in the case which Professor Wadsworth deals with. *Each point* in the uniformly illuminated sky considered by him contributes to the illumination of the photographic plate a quantity of light which is proportional to the area of the object glass; but *the scale of the photograph of the sky* depends on the focal length of the object glass.

The criticism and attempted explanation which Professor Wadsworth gives of practical results obtained with large and small reflectors and refractors falls to the ground. Professor Wadsworth's conclusions are incorrect.

In the *Astrophysical Journal*, vol. vi. 1897 August, p. 132, it is clear that there is discontinuity in Wadsworth's solutions. On p. 132 he arrives at the correct result that for large finite illuminated surfaces the intensity on the photographic plate is proportional to $\frac{A^2}{f^2}$. But on the following page he reaches the incorrect result that for the large sky the intensity is proportional to A^2.

On the Apparent Diurnal Motion of Stars in relation to the Adjustment of the Polar Axis of a Telescope. By C. Davidson, Royal Observatory, Greenwich.

(*Communicated by W. H. M. Christie, Astronomer Royal.*)

In *Monthly Notices*, vol. 57, No. 2, Professor Rambaut has discussed the variable effect which refraction has on the apparent motion of stars, and proposes a method by which an equatorial telescope may be kept accurately pointed on a star by introducing corresponding variations into the rate of the driving clock.

In this paper, however, he does not take into account any want of adjustment of the polar axis of the telescope. If this does not point to the Pole, an additional variation in the rate of

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